DOW™ FILMTEC™ Membranes

DOW FILMTEC BW30-400 High Rejection, High Surface Area Brackish Water RO Element

Features

The DOW™ FILMTEC™ BW30-400 is the product of choice when the highest quality permeate is required. It was the first 400 square foot membrane element on the market and continues to be widely used in new equipment and retrofits where system capital and productivity are factors.

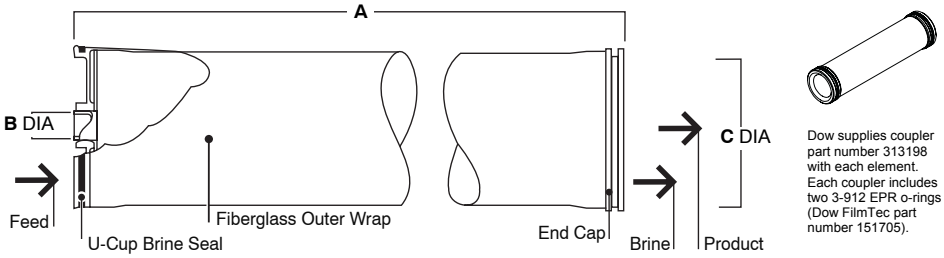
- Dow's superior automated manufacturing technology results in the most consistent performance element-to-element and year-after-year.
- BW30-400 elements deliver high flow and high rejection without being chlorinated during the manufacturing process. This is one reason why DOW FILMTEC elements are more durable and may be cleaned over a wider pH range (pH 1-13) than other RO elements.
- With more than a decade of proven performance, BW30-400 is the product you can rely on for years of trouble-free operation.

Product Specifications

Product	Part number	Active area ft² (m²)	Feed spacer thickness (mil)	Permeate flow rate gpd (m³/d)	Stabilized salt rejection (%)	Minimum salt rejection (%)
BW30-400	98650	400 (37)	28	10,500 (40)	99.5%	99.0%

1. Permeate flow and salt rejection based on the following standard conditions: 2,000 ppm NaCl, 225 psi (15.5 bar), 77°F (25°C), pH 8 and 15% recovery.
2. Flow rates for individual elements may vary but will be no more than 15% below the value shown.
3. Sales specifications may vary as design revisions take place.
4. Active area guaranteed +/-3%. Active area as stated by Dow is not comparable to nominal membrane area often stated by some manufacturers. Measurement method described in Form No. 609-00434.

Figure 1



Dimensions – inches (mm)

Product	A	B	C
BW30-400	40.0 (1,016)	1.125 ID (29)	7.9 (201)

1. Refer to Dow FilmTec Design Guidelines for multiple-element applications and recommended element recovery rates for various feed sources.
2. Element to fit nominal 8.0-inch (203 mm) I.D. pressure vessel.

1 inch = 25.4 mm

Operating Limits

• Membrane Type	Polyamide Thin-Film Composite
• Maximum Operating Temperature[a]	113°F (45°C)
• Maximum Operating Pressure	600 psig (41 bar)
• Maximum Pressure Drop	15 psig (1.0 bar)
• pH Range, Continuous Operation[a]	2 - 11
• pH Range, Short-Term Cleaning (30 min.)[b]	1 - 13
• Maximum Feed Flow	85 gpm (19 m³/hr)
• Maximum Feed Silt Density Index	SDI 5
• Free Chlorine Tolerance[c]	< 0.1 ppm

[a] Maximum temperature for continuous operation above pH 10 is 95°F (35°C).

[b] Refer to Cleaning Guidelines in specification sheet 609-23010.

[c] Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Dow recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

Important Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.

Before initiating system start-up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.

Please refer to the application information literature entitled “Start-Up Sequence” (Form No. 609-02077) for more information.

Operation Guidelines

Avoid any abrupt pressure or cross-flow variations on the spiral elements during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. During start-up, a gradual change from a standstill to operating state is recommended as follows:

- Feed pressure should be increased gradually over a 30-60 second time frame.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.
- Permeate obtained from first hour of operation should be discarded.

General Information

- Keep elements moist at all times after initial wetting.
- If operating limits and guidelines given in this bulletin are not strictly followed, the DOW™ FILMTEC™ Reverse Osmosis and Nanofiltration Three-Year Prorated Limited Warranty (Form No. 609-35010) will be null and void.
- To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.
- The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.
- Maximum pressure drop across an entire pressure vessel (housing) is 50 psi (3.4 bar).
- Avoid static permeate-side backpressure at all times.

Regulatory Note

These membranes may be subject to drinking water application restrictions in some countries: please check the application status before use and sale.

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DOW™ FILMTEC™ Membranes

DOW FILMTEC BW30-400/34*i* Durable High Productivity, High Rejection Brackish Water RO Element with *iLEC*™ Interlocking Endcaps

Features

The DOW FILMTEC™ BW30-400/34*i* element is the ultimate element for durable, high-rejection, high-productivity performance in high fouling or challenging feed conditions, enabling trouble-free operation and a low cost of water.

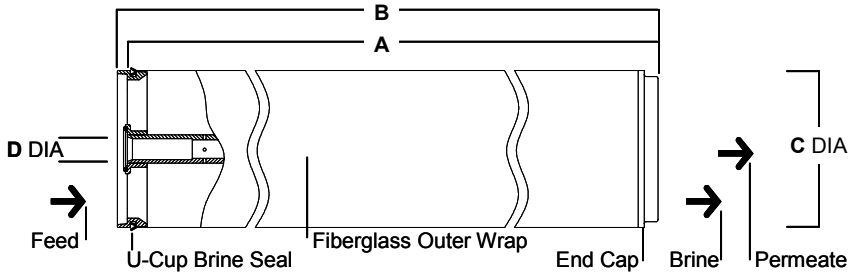
- Features a 34 mil feed spacer to lessen the impact of fouling on pressure drop across a vessel and enhance cleaning effectiveness.
- Offers the proven performance and high productivity of the DOW FILMTEC BW30 membrane
- Delivers a lower total cost of water by enabling lower capital and/or operating expenses compared to 365 sq. ft. elements.
- Includes *iLEC*™ interlocking endcaps, which reduce system operating costs and the risk of o-ring leaks that can cause poor water quality.

Product Specifications

Product	Part number	Active area ft² (m²)	Feed spacer thickness (mil)	Permeate flow rate gpd (m³/d)	Stabilized salt rejection (%)	Minimum salt rejection (%)
BW30-400/34*i*	248151	400 (37)	34	10,500 (40)	99.5%	99.0%

1. Permeate flow and salt rejection based on the following standard conditions: 2,000 ppm NaCl, 225 psi (15.5 bar), 77°F (25°C), pH 8 and 15% recovery.
2. Flow rates for individual elements may vary but will be no more than 15% below the value shown.
3. Sales specifications may vary as design revisions take place.
4. Active area guaranteed +/-5%. Active area as stated by Dow is not comparable to nominal membrane area often stated by some manufacturers. Measurement method described in Form No. 609-00434.

Figure 1



Product	Dimensions – inches (mm) A	B	C	D
BW30-400/34*i*	40.0 (1,016)	40.5 (1,029)	7.9 (201)	1.125 ID (29)

1. Refer to Dow FilmTec Design Guidelines for multiple-element applications and recommended element recovery rates for various feed sources. 1 inch = 25.4 mm
2. Element to fit nominal 8.0-inch (203 mm) I.D. pressure vessel.
3. Individual elements with *iLEC* endcaps measure 40.5 inches (1,029 mm) in length (B). The net length (A) of the elements when connected is 40.0 inches (1,016 mm).

Operating Limits

• Membrane Type	Polyamide Thin-Film Composite
• Maximum Operating Temperature[a]	113°F (45°C)
• Maximum Operating Pressure	600 psig (41 bar)
• Maximum Pressure Drop	15 psig (1.0 bar)
• pH Range, Continuous Operation[a]	2 - 11
• pH Range, Short-Term Cleaning (30 min.)[b]	1 - 13
• Maximum Feed Flow	85 gpm (19 m^3/hr)
• Maximum Feed Silt Density Index	SDI 5
• Free Chlorine Tolerance[c]	<0.1 ppm

[a] Maximum temperature for continuous operation above pH 10 is 95°F (35°C).

[b] Refer to Cleaning Guidelines in specification sheet 609-23010.

[c] Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Dow recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

Important Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.

Before initiating system start-up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.

Please refer to the application information literature entitled “Start-Up Sequence” (Form No. 609-02077) for more information.

Operation Guidelines

Avoid any abrupt pressure or cross-flow variations on the spiral elements during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. During start-up, a gradual change from a standstill to operating state is recommended as follows:

- Feed pressure should be increased gradually over a 30-60 second time frame.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.
- Permeate obtained from first hour of operation should be discarded.

General Information

- Keep elements moist at all times after initial wetting.
- If operating limits and guidelines given in this bulletin are not strictly followed, the DOW™ FILMTEC™ Reverse Osmosis and Nanofiltration Three-Year Prorated Limited Warranty (Form No. 609-35010) will be null and void..
- To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.
- The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.
- Maximum pressure drop across an entire pressure vessel (housing) is 50 psi (3.4 bar).
- Avoid static permeate-side backpressure at all times.

Regulatory Note

These membranes may be subject to drinking water application restrictions in some countries: please check the application status before use and sale.

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DOW FILMTEC™ Membranes

DOW FILMTEC Fiberglassed Elements for Light Industrial Systems

Features

DOW FILMTEC™ brackish water reverse osmosis membrane elements provide consistent, outstanding system performance in light industrial applications.

- DOW FILMTEC LE-4040 delivers highest performance at lowest pressure resulting in less energy usage and lower costs.
- DOW FILMTEC BW30-4040 is the industry standard for reliable operation and production of the highest quality water.
- DOW FILMTEC BW30-2540 elements are designed for systems smaller than 1 gpm (0.2 m^3/h) offering a hard shell exterior for extra strength.

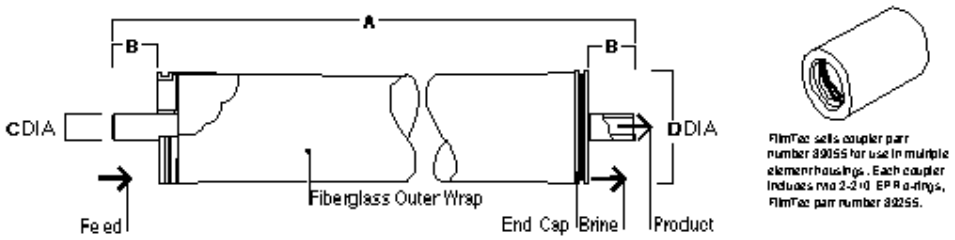
Elements with a hard shell exterior are recommended for systems with multiple-element housings containing three or more membranes, as they are designed to withstand higher pressure drops.

Product Specifications

Product	Part Number	Feed Spacer Thickness (mil)	Permeate Flow Rate gpd (m^3/d)	Stabilized Salt Rejection (%)
LE-4040	275173	34	2,500 (9.5)	99.0
BW30-4040	80783	34	2,400 (9.1)	99.5
BW30-2540	80766	28	850 (3.2)	99.5

1. Permeate flow and salt rejection based on the following test conditions: 2,000 ppm NaCl, applied pressure: 150 psig (10.3 bar) for LE-4040 and 225 psig (15.5 bar) for BW30-4040 and BW30-2540, 77°F (25°C) and 15% recovery.
2. Permeate flows for individual elements may vary +/-20%.
3. For the purpose of improvement, specifications may be updated periodically.
4. LE-4040 replaces BW30LE-4040.

Figure 1



Product	Dimensions – Inches (mm) A	B	C	D
LE-4040	40.0 (1,016)	1.05 (26.7)	0.75 (19)	3.9 (99)
BW30-4040	40.0 (1,016)	1.05 (26.7)	0.75 (19)	3.9 (99)
BW30-2540	40.0 (1,016)	1.19 (30.2)	0.75 (19)	2.4 (61)

1. Refer to DOW FILMTEC Design Guidelines for multiple-element systems.
2. BW30-2540 elements fit nominal 2.5-inch I.D. pressure vessel. BW30LE-4040 and BW30-4040 elements fit nominal 4-inch I.D. pressure vessel.

1 inch = 25.4 mm

Operating Limits

• Membrane Type	Polyamide Thin-Film Composite
• Maximum Operating Temperature[a]	113°F (45°C)
• Maximum Operating Pressure	600 psi (41 bar)
• Maximum Feed Flow Rate - 4040 elements	16 gpm (3.6 m^3/h)
- 2540 elements	6 gpm (1.4 m^3/h)
• Maximum Pressure Drop	15 psig (1.0 bar)
• pH Range, Continuous Operation[a]	2 - 11
• pH Range, Short-Term Cleaning[b]	1 - 13
• Maximum Feed Silt Density Index	SDI 5
• Free Chlorine Tolerance[c]	<0.1 ppm

[a] Maximum temperature for continuous operation above pH 10 is 95°F (35°C).

[b] Refer to Cleaning Guidelines in specification sheet 609-23010.

[c] Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, DOW FILMTEC recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

Important Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.

Before initiating system start-up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.

Please refer to the application information literature entitled “Start-Up Sequence” (Form No. 609-02077) for more information.

Operation Guidelines

Avoid any abrupt pressure or cross-flow variations on the spiral elements during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. During start-up, a gradual change from a standstill to operating state is recommended as follows:

- Feed pressure should be increased gradually over a 30-60 second time frame.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.
- Permeate obtained from first hour of operation should be discarded.

General Information

- Keep elements moist at all times after initial wetting.
- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.
- The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.
- Maximum pressure drop across an entire pressure vessel (housing) is 50 psi (3.4 bar).
- Avoid static permeate-side backpressure at all times.

Regulatory Note

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China: +86 21 2301 1000
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DOW FILMTEC™ Membranes

Large Commercial 4040 Reverse Osmosis Elements

Features

DOW FILMTEC™ LC 4040 product range are available to meet a wide variety of customer needs in commercial applications, from producing high purity water to delivering low total system costs. Dow's fully automated element production enables the most consistent products in the industry that minimizes the total cost of ownership of water treatment systems.

- LC HR-4040 produces high quality water with our state of the art RO membrane.
- LC LE-4040 delivers high quality water at low pressure at harsh water conditions, using Dow's innovative, proprietary technology for low energy applications.

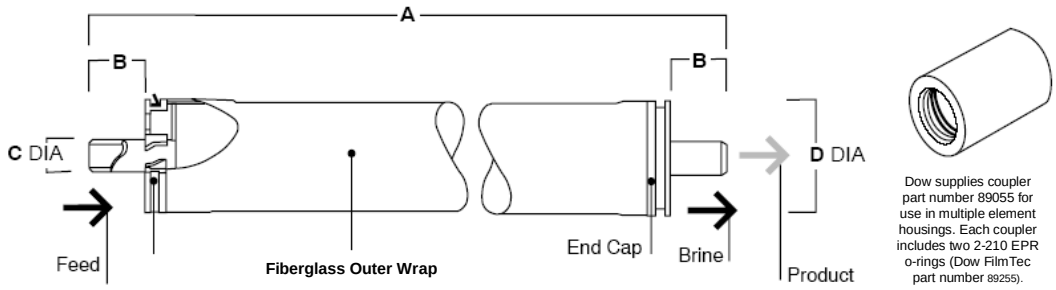
Product Specifications

Product	Part Number Dry (Wet)	Feed Spacer Thickness (mil)	Permeate Flow Rate gpd (m^3/d)	Min. Salt Rejection (%)	Stabilized Salt Rejection (%)
LC HR-4040	343771 / (343770)	28	2900 (11)	99.5	99.7
LC LE-4040	356603 / (356602)	28	2500 (9.5)	99.0	99.2

1. Permeate flow and salt rejection based on the following test conditions: 2000 ppm NaCl, 77°F (25°C), 15% recovery, pH 8, and applied pressure 225 psig for LC HR and 125 psig for LC LE
2. Permeate flows for individual elements may vary +/-15%.
3. For the purpose of improvement, specifications may be updated periodically.

LC HR-4040	Solute	NH_4^+	NO_3^-	SiO_2	Boron
	Typical rejection (%)	98.8	98.2	99.8	80.0

Figure 1



Product	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
LC HR-4040 and LC LE-4040	**40.00 (1016)**	**1.05 (25.7)**	**0.75 (19)**	**3.9 (99)**

1. Refer to DOW FILMTEC™ Design Guidelines for multiple-element systems
2. LC HR-4040 and LC HRLE-4040 elements fit nominal 4-inch I.D. pressure vessel.

Operating Limits

Membrane type	Polyamide Thin-Film Composite
Maximum operating temperature[a]	113°F (45°C)
Maximum operating pressure	600 psig (41 bar)
Maximum pressure drop	15 psig (1.0 bar)
Maximum feed flow rate, gpm (m^3/h)	16 gpm (3.6 (m^3/h))
pH range, continuous operation[a]	2 - 11
pH range, short-term cleaning[b]	1 – 13
Maximum Feed Silt Density Index	SDI 5
Free chlorine concentration[c]	< 0.1 ppm

a. Maximum temperature for continuous operation above PH 10 is 95°F (35°C).

b. Refer to Cleaning Guidelines in specification sheet 609-23010.

c. Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Dow recommends removing residual free chlorine and other oxidants by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

General Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.

Before initiating system start-up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.

Please refer to the application information literature entitled “Start-Up Sequence” (Form No. 609-02077) for more information.

Operation Guidelines

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- Feed pressure should be increased gradually over a 30-60 second time frame.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.
- Permeate obtained from first hour of operation should be discarded.

Important Information

Keep elements moist at all times after initial wetting.

If operating limits and guidelines given in this Product Bulletin are not strictly followed, the limited warranty in Form No. 609-35010 will be null and void.

To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.

The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.

Maximum pressure drop across an entire pressure vessel (housing) is 50 psi (3.4 bar).

Avoid static permeate-side backpressure at all times.

Regulatory Note

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